EPA Region 1: Tanks

Gasoline Storage and Distribution

Heavy Oil Storage (Asphalt and #6)

Geospatial Mapping of Air Pollution (GMAP) image of terminals in New Haven, CT.

Gasoline Storage and Distribution

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Relevant Federal Regulations

- **40 CFR Part 60, Subpart XX:** Standards of Performance for Bulk Gasoline Terminals
- **40 CFR Part 63, Subpart R:** National Emission Standards for Gasoline Distribution Facilities (Bulk Gasoline Terminals and Pipeline Breakout Stations)
- **40 CFR Part 63, Subpart BBBBBB:** National Emission Standards for Hazardous Air Pollutants for Source Category: Gasoline Distribution Bulk Terminals, Bulk Plants, and Pipeline Facilities

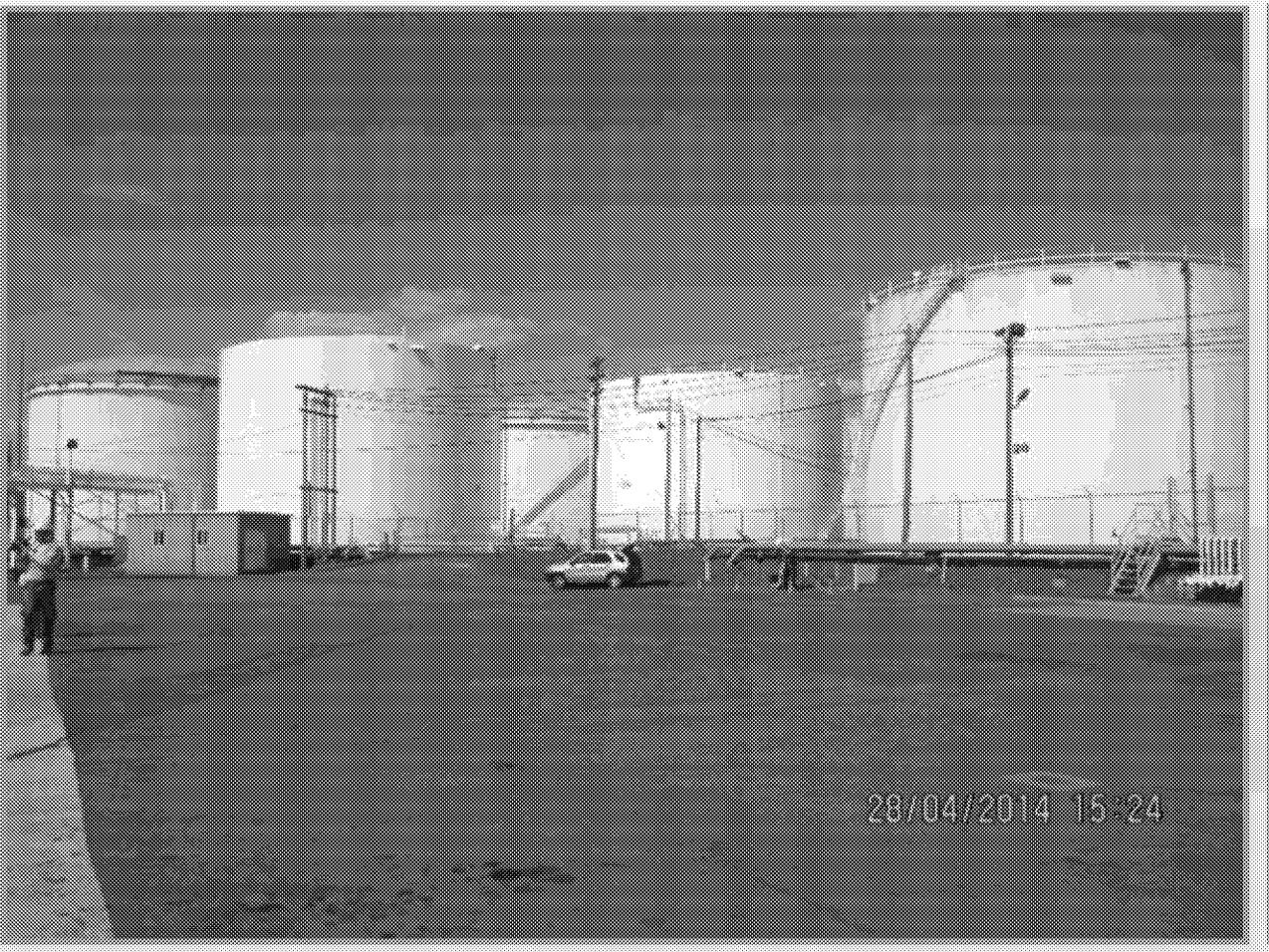
Gasoline Storage and Distribution

Specific Compliance Issues

- **NSPS XX 60.502(h)**: *The vapor collection and liquid loading equipment shall be designed and operated to prevent gauge pressure in the delivery tank from exceeding 4,500 pascals (450 mm of water) during product loading.*
- **NSPS XX 60.502(i)**: *No pressure vacuum vent in the bulk gasoline terminal's vapor collection system shall begin to open at a system pressure less than 4,500 pascals (450 mm of water).*
- **Subpart BBBBBB 63.11085(a):** *You must, at all times, operate and maintain any affected source, including associated air pollution control equipment and monitoring equipment, in a manner consistent with safety and good air pollution control practices for minimizing emissions.*

Gasoline Storage and Distribution

Storage tanks



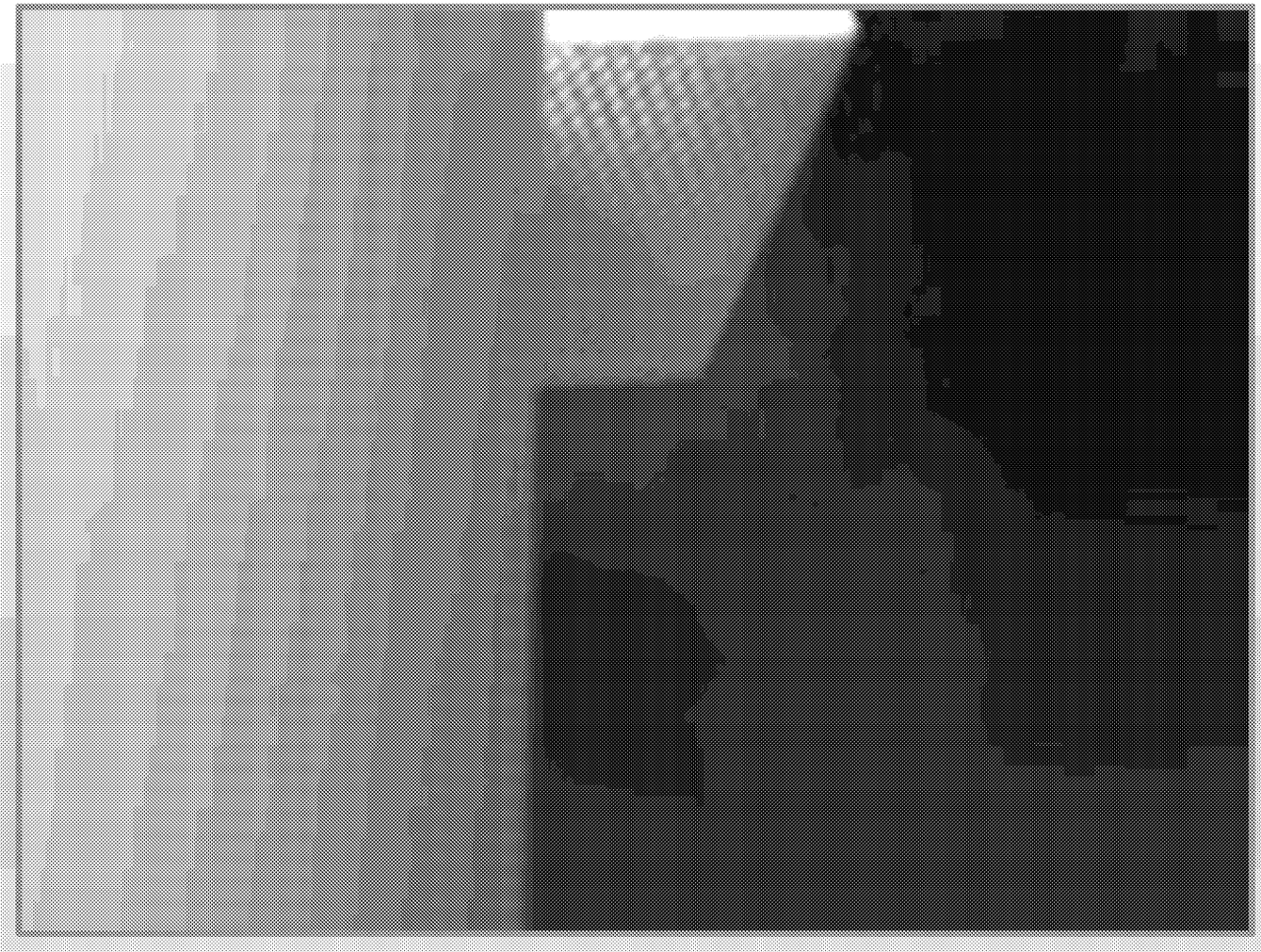
Loading racks

Gasoline Storage Tanks

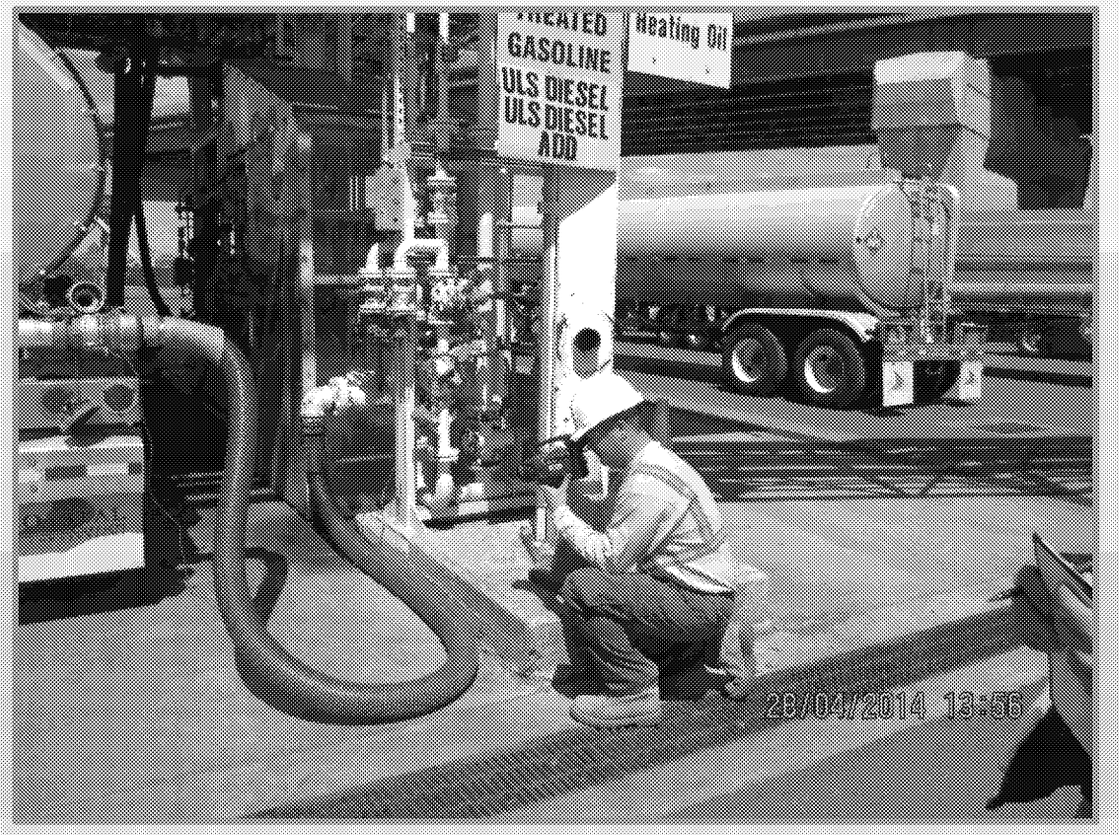
Internal Floating Roof Tanks

FLIR can be used to identify tanks with possible excess emissions

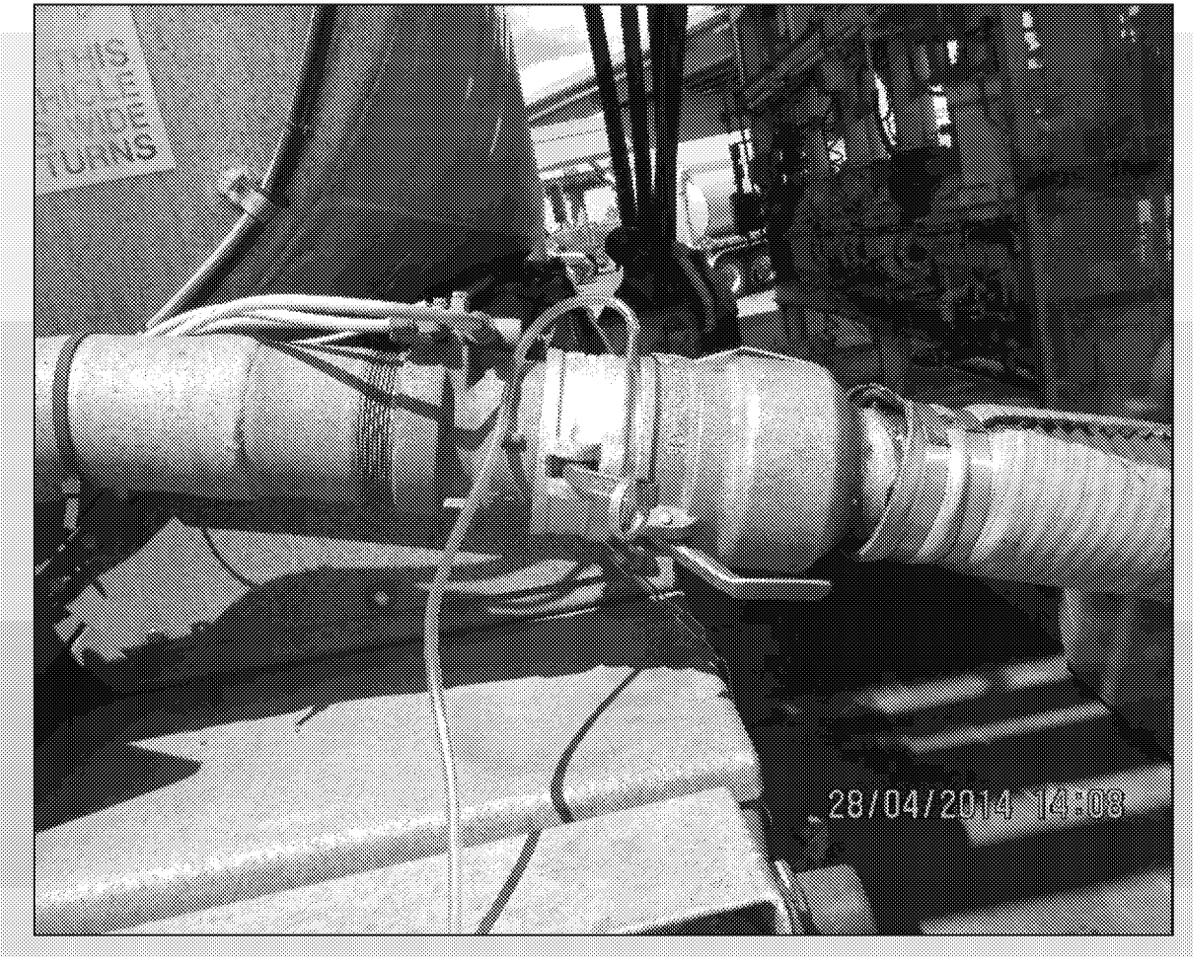
- IFR failure
- Otherwise unexplained excess emissions
- Targeted external and/or internal inspection follow-up



Using FLIR to Check for Leaks at the Loading Rack while Monitoring System Under Pressure



Monitoring Technologies:
U-Tube Pressure Gauge and Vapor Line Coupling



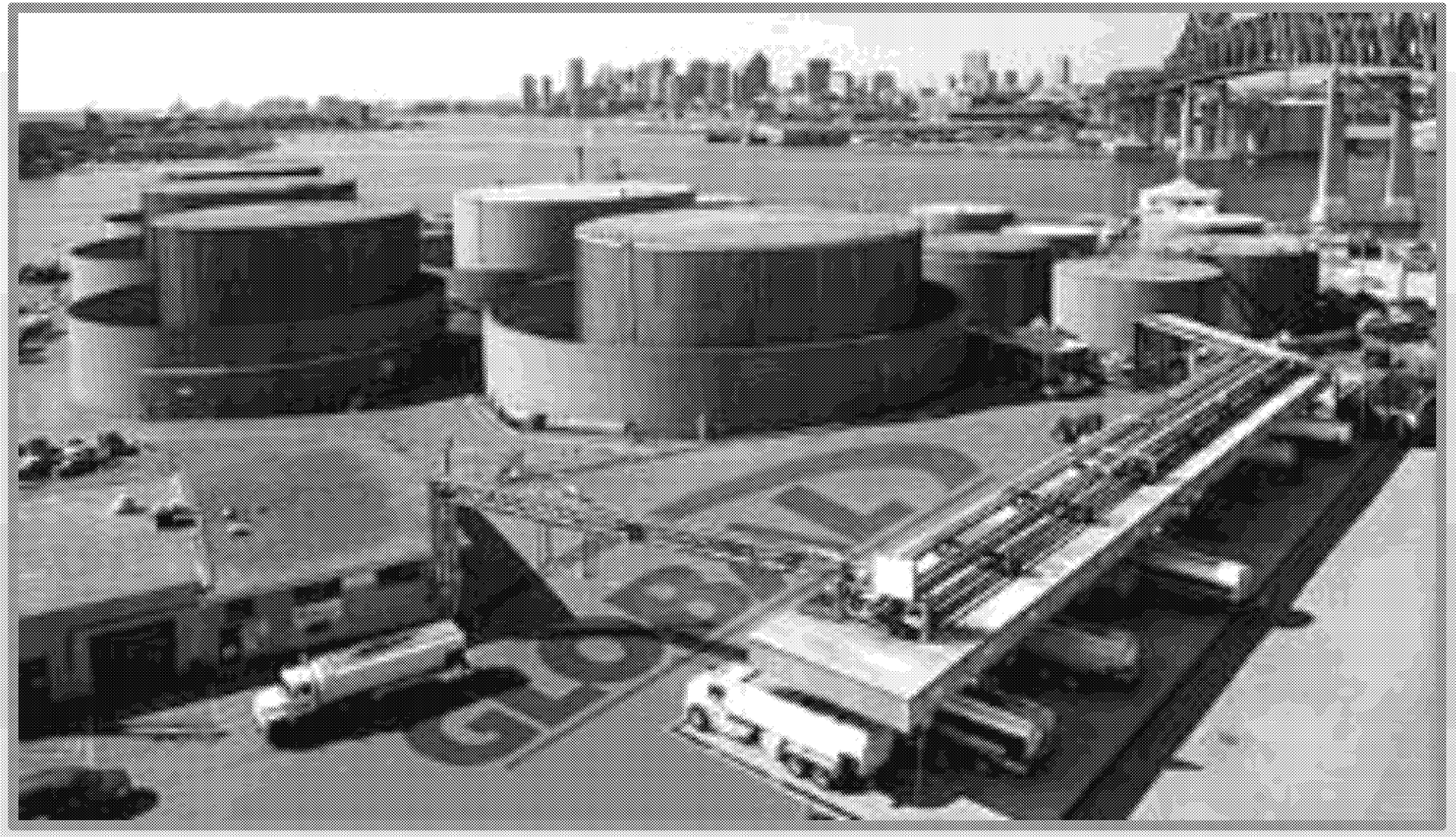
Checking Pressure Vacuum Relief Valve (PVRV) for Leaks While System Under Pressure

Gasoline Storage and Distribution - Summary

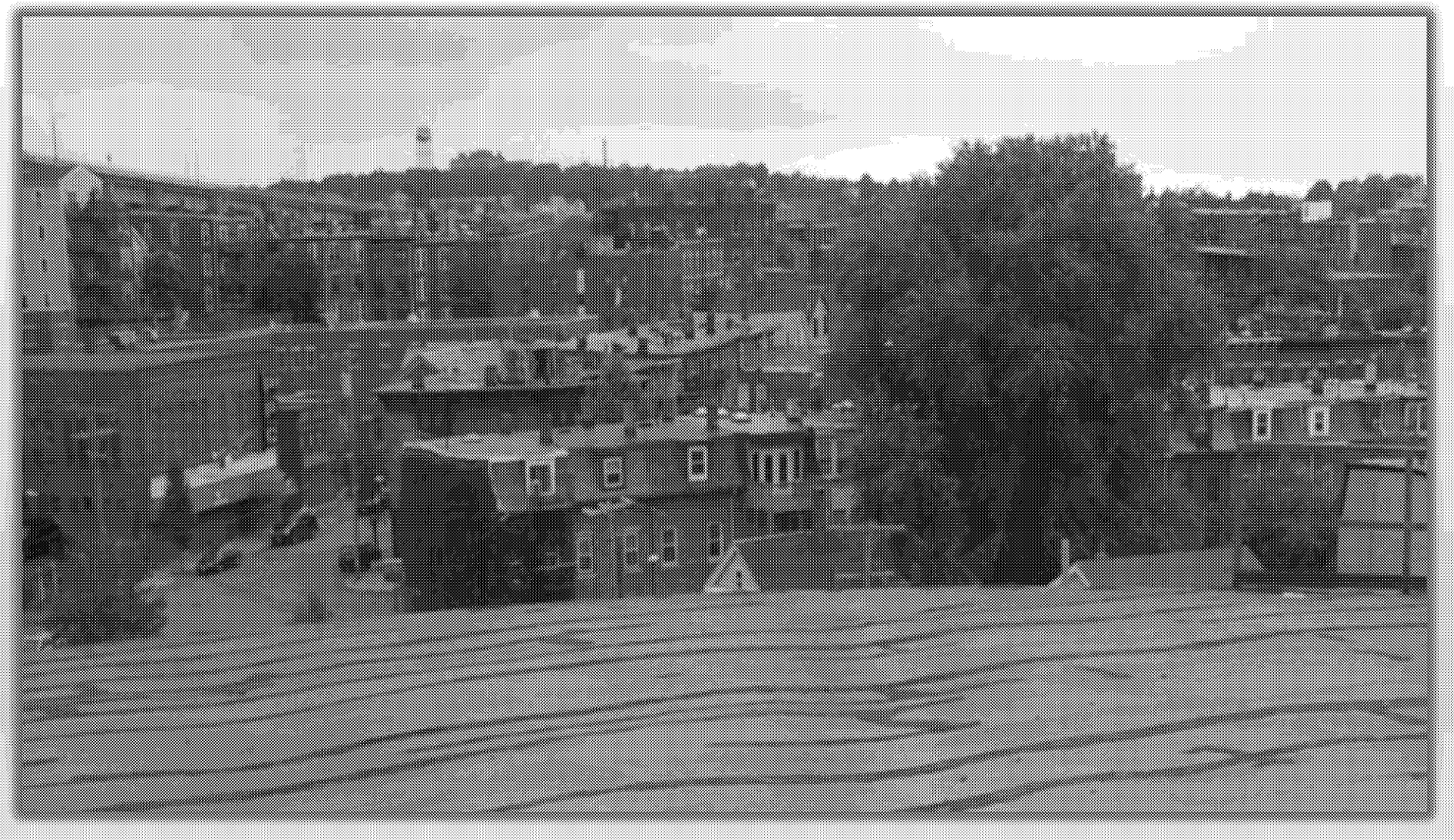
- FLIR video provides real-time evidence of excess emissions (and product loss).
- Vapor hose and PVRV repairs can be made quickly (some repairs can be made immediately).
- Floating roofs can also be a source of excess emissions.
- To address excess emissions of VOC and HAP, Region 1 has promptly issued administrative orders to require repair of vapor hoses and PVRVs.

Heavy Oil Storage (Asphalt and #6)

Heavy Oil Storage: Global Oil in Chelsea, MA



Heavy Oil Storage: Global Oil in Chelsea, MA

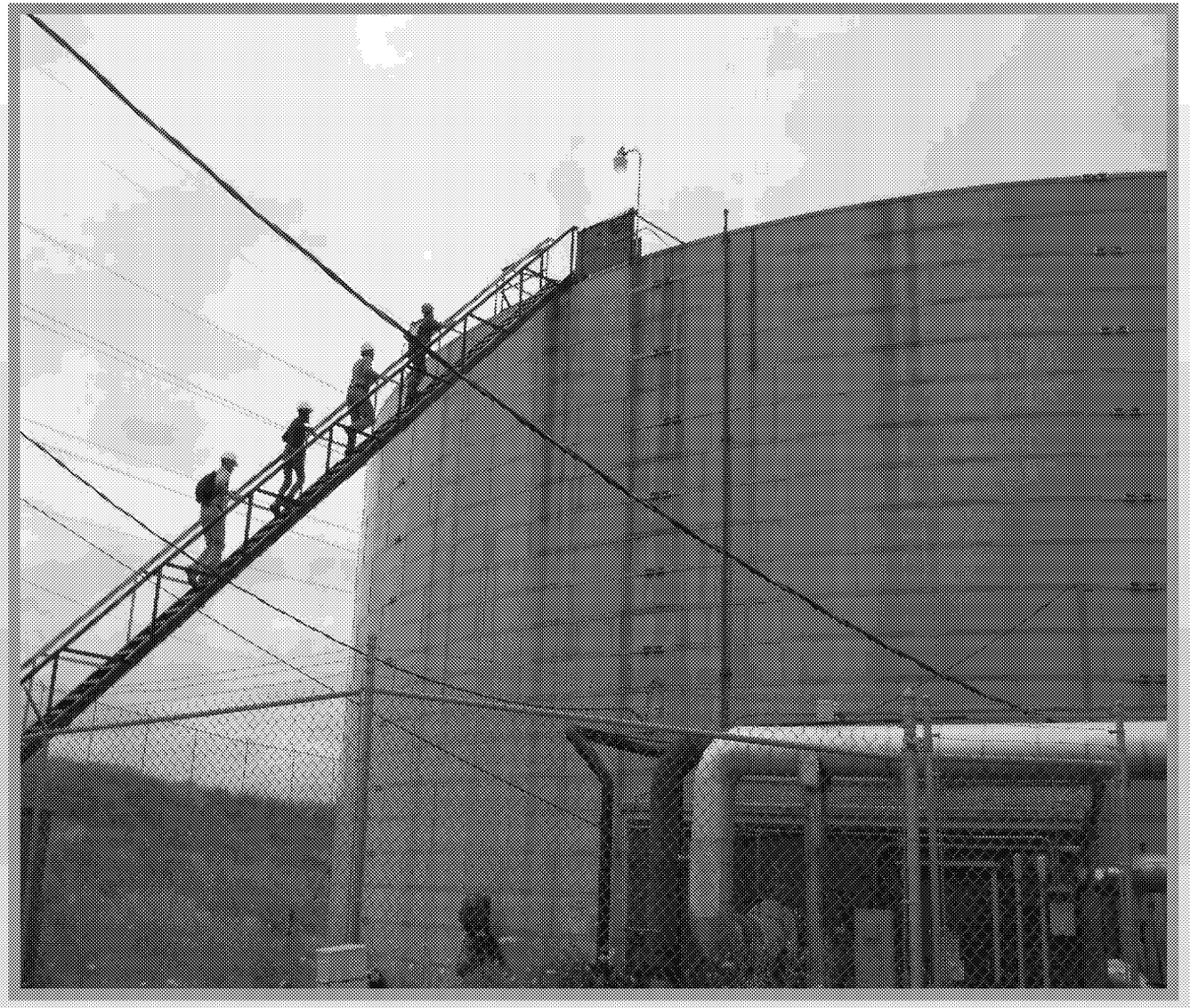


Heavy Oil Storage: Overview

- Asphalt and #6 are mixtures of heavy, low volatile residual oil that are cut with lighter, more volatile hydrocarbons.
- These storage tanks are currently unregulated and uncontrolled for VOC emissions.
- Historic VOC emissions factors for these tanks are wrong (AP-42) and estimation techniques are fundamentally flawed due to challenges measuring the vapor pressure of heated liquids accurately.
- EPA has pursued testing and determined that VOC emissions from these storage tanks are significant.

Heavy Oil Storage: Investigation

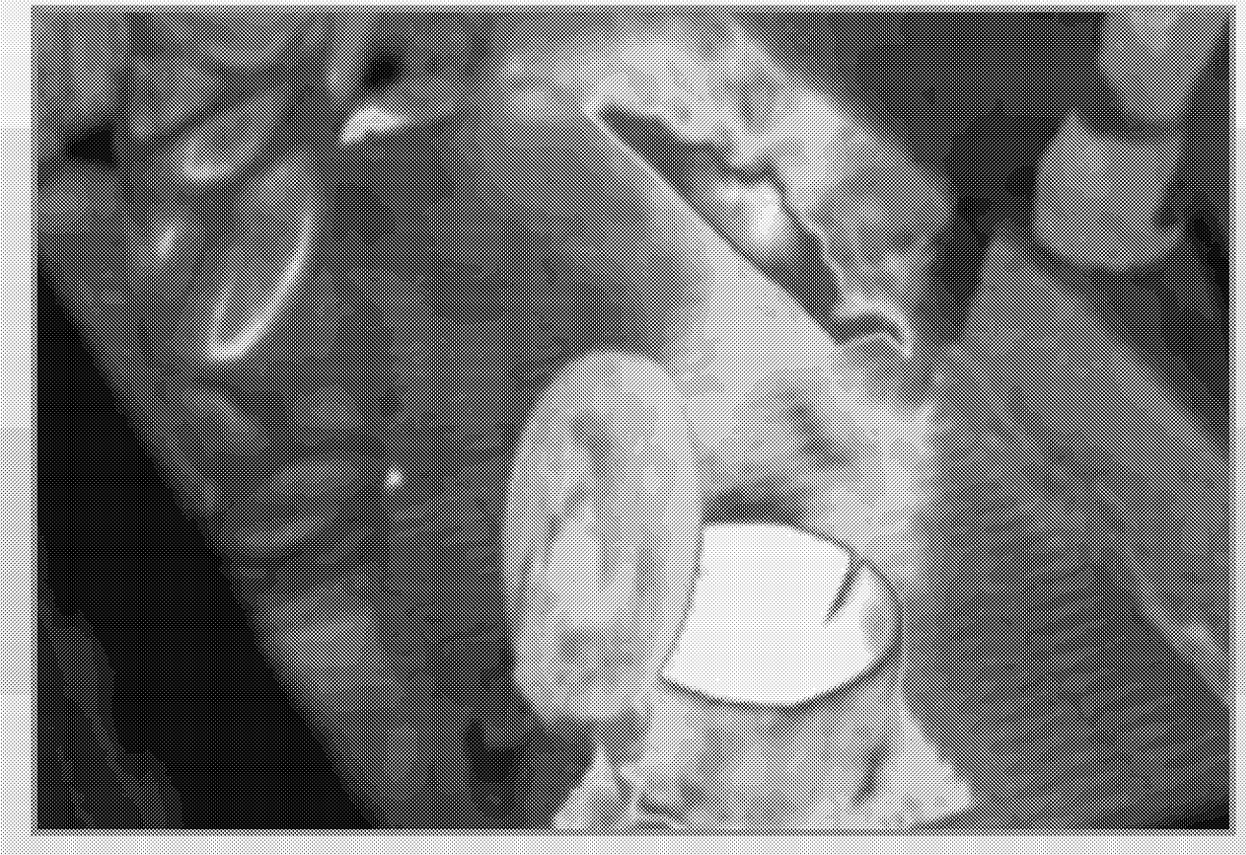
- **Issued reporting requirement and sampling order to 5 companies**
  - **Exxon, Irving, Sprague, Motiva, & Gulf**
- **Conducted 12 Inspections with OEME**
- **Included GMAP monitoring with NEIC**
- **Issued testing orders to Sprague and Global**
  - **Emissions testing**
  - **Vapor Pressure testing**



Heavy Oil Storage: Investigation

Regular digital photo of residual fuel oil (#6 oil) tank hatch

FLIR Gasfinder Infrared photo of #6 oil tank hatch



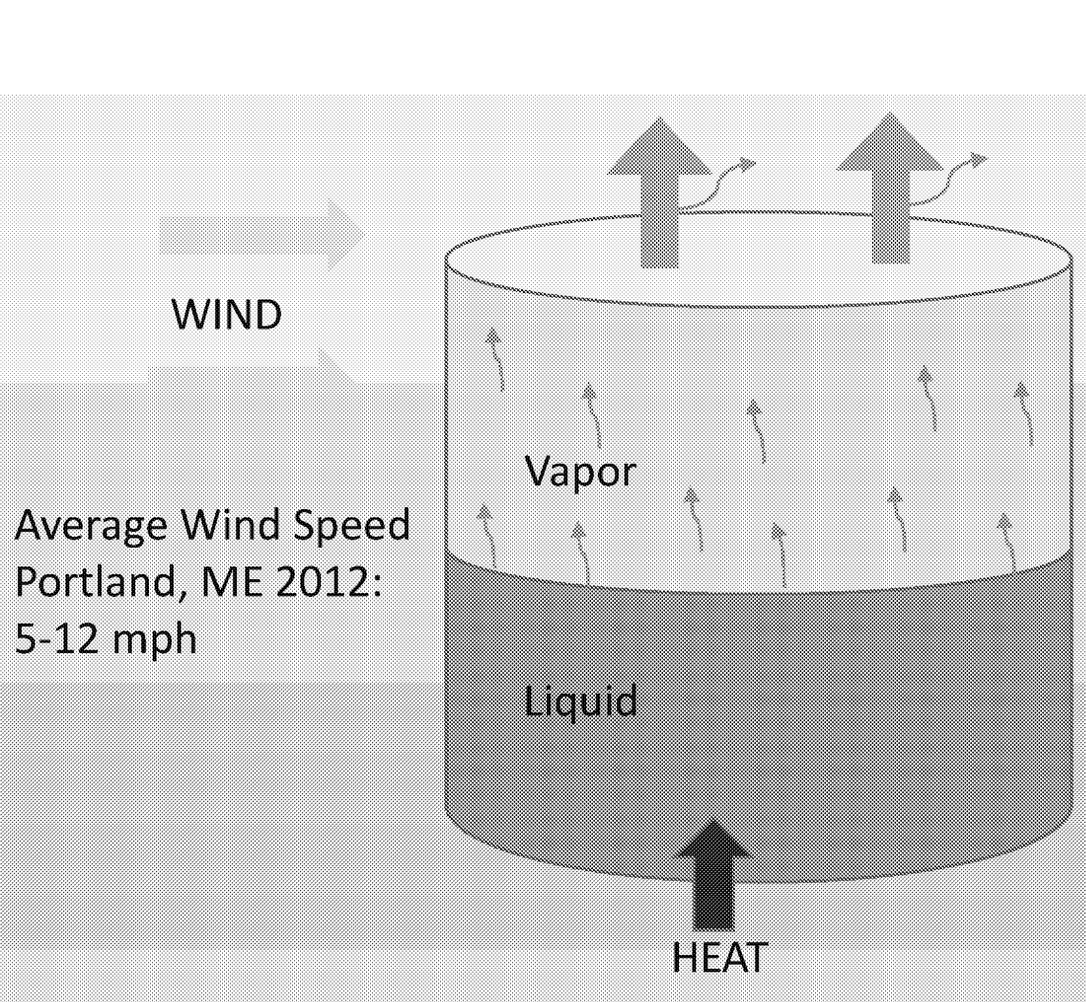
Heavy Oil Storage: FLIR video of #6 oil tank

Heavy Oil Storage: FLIR video of #6 oil truck

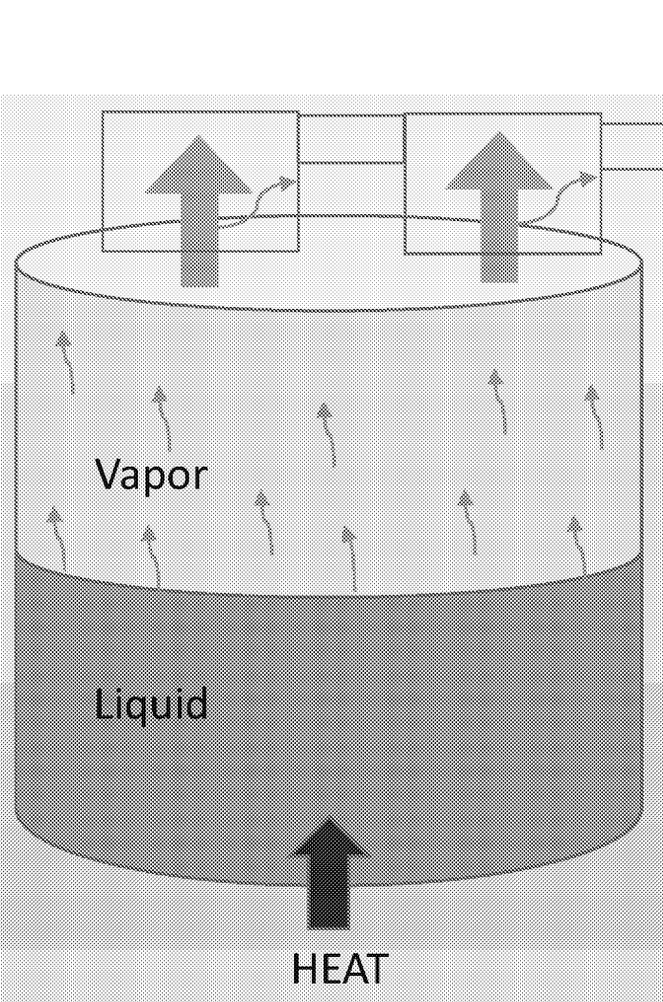
Heavy Oil Storage – Vapor Pressure Sampling/Analysis Challenges

- **Required sampling of asphalt and #6 to determine vapor pressure.**
- **Heavy oils are stored in heated tanks. Samples should be kept at their storage temperature.**
- **VOC from cutter stock are lost (driven off) in handing and processing of samples according to the ASTM methods.**
- **As a result, vapor pressure sampling tends to underestimate emissions.**

Heavy Oil Storage: Sampling Method



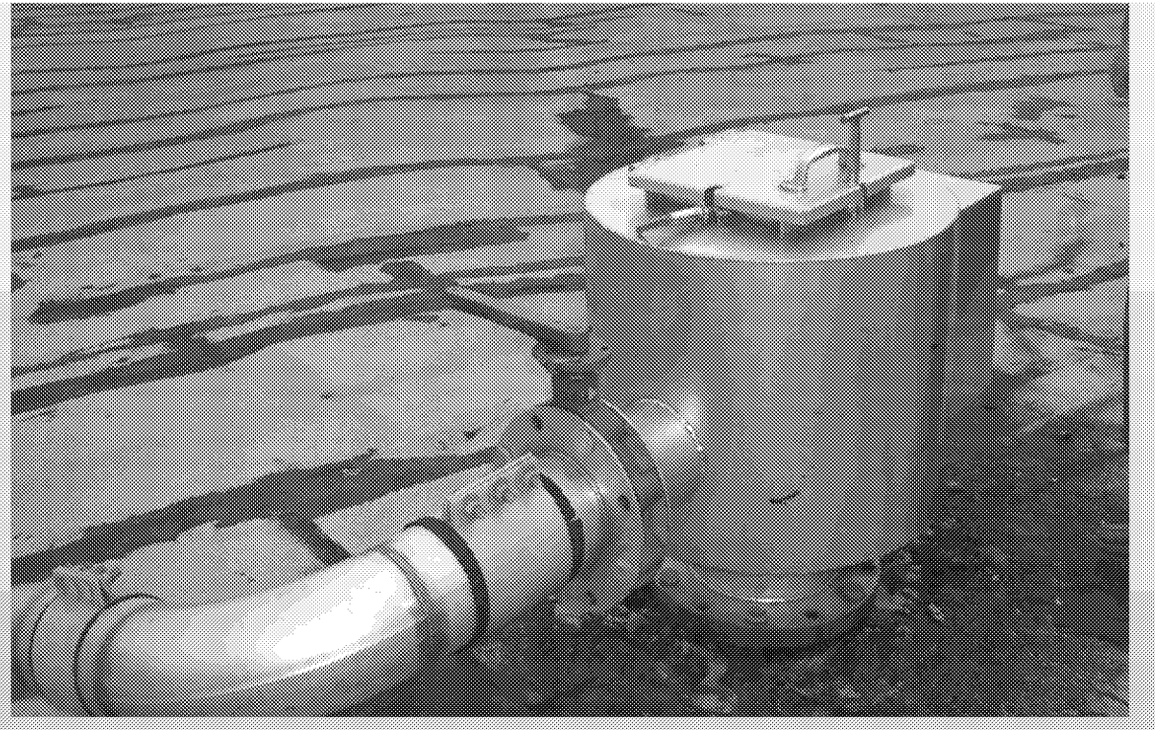
Average Wind Speed
Portland, ME 2012:
5-12 mph



Blower Speed equivalent to:
10.9 mph at sample port or
0.2 mph at each vent

Heavy Oil Storage: Emissions Test

- Tank breathing was monitored continuously for 30 days
- Emissions from ten tanker trucks were monitored
- Vessel transfer was included in the testing



Heavy Oil Storage: Testing and Sampling

- Used EPA Methods
- VOC emissions: Tank Breathing
  - #6 oil: up to 10.6 tpy per tank
  - Asphalt: up to 5.3 tpy per tank
- VOC emissions: Working Losses
  - #6 oil: up to 11.2 lbs/hr
  - Asphalt: up to 3.9 lbs/hr

Heavy Oil Storage: Enforcement

Federally Enforceable State Regulations

- Minor New Source Review
- VOC RACT

Enforcement

- Facilities located in 4 New England states
  - ME, NH, MA, RI
- Issued NOVs to 5 facilities in 3 states to date

Heavy Oil Storage: Summary

- **Emissions from all #6 oil and asphalt tanks are significantly higher than previously thought**
- **Emission controls would be effective at these facilities**
- **Based on Region 1's investigation, OECA has expanded the scope nationally**